

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference PF020098	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/50325	International filing date (day/month/year) 21.07.2003	Priority date (day/month/year) 30.07.2002
International Patent Classification (IPC) or both national classification and IPC H01Q9/40		
Applicant THOMSON LICENSING S.A et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 11.02.2004	Date of completion of this report 05.11.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Kruck, P Telephone No. +49 89 2399-7129 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/50325**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-6 as originally filed

Claims, Numbers

1-8 received on 14.08.2004 with letter of 30.07.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-8
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-8
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/50325

Referring to Item I: Basis of the report

The amendments filed with the letter dated 30.07.2004 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned relate to independent method type Claim 5 and dependent Claim 6. These claims present a manufacturing process of a broadband antenna according to the second embodiment (cf. Fig. 4) comprising a step of injection molding, whereas in the application as filed this antenna is made by machining of a block (see description page 6, lines 11-12).

Referring to Item V: Reasoned statement under Article 35 (2) PCT with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: US-A-2 239 724 (LINDENBLAD NILS E) 29 April 1941 (1941-04-29)
- D2: US-A-4 788 554 (SMITH EDWARD W) 29 November 1988 (1988-11-29)
- D3: GB-A-2 105 914 (MARCONI CO LTD) 30 March 1983 (1983-03-30)
- D4: US-A-2 454 766 (BRILLOUIN LEON N) 30 November 1948 (1948-11-30)
- D5: EP-A-1 189 305 (ZENDAR SPA) 20 March 2002 (2002-03-20)

1. Inventive Step

- 1.1 The subject-matter of Claim 1 does not appear to involve an inventive step (Article 33 (3) PCT). D1, which is considered to represent the most relevant state of the art, discloses a broadband monopole antenna comprising a cup-shaped radiating element (D1, Fig. 10, 51) mounted on an earth plane forming support of annular shape (D1, Fig. 10, 52), said radiating element being formed by a hollow element of metallizable material (D1, Fig. 1, page 4, left-hand column, line 37 and lines 43-45). Consequently, the present formulation of the subject-matter of Claim 1 differs from the antenna disclosed in D1 only in that radiating element and earth plane forming support are integrally formed on a hollow element of metallizable plastic or foam. However, such an integral formation is well known to the skilled person in the field of broadband monopole antennas (cf. D5, Fig. 2, 1, 2, 4, 12; Fig. 3, 1, 2, 4', 12) in order to achieve compactness and ease of manufacture of the antenna. Therefore, the integral formation of a cup-shaped radiating element and earth plane forming support on a plastic element is regarded as a straightforward design possibility, the skilled person would readily select without the need of inventive skill.
- 1.2 Furthermore, the subject-matter of independent method type Claims 5, 7 and dependent Claims 6, 8 does not appear to involve an inventive step.

* As to Claim 5, an injection molding process followed by metallization steps such

as plating, is a state-of-the-art technique well known to the skilled person in the manufacturing of shaped antenna elements, (cf. D2, column 2, lines 64-66; column 3, lines 1-4; Fig. 3, cup-shaped antenna element 10). This objection applies equally to Claim 6, being dependent on Claim 5.

- * As to Claim 7, 8, a manufacturing process, wherein a shaped antenna element is made by machining a block of plastic material, followed by a metallization step such as vapour deposition, is a straightforward process well known to the skilled person (cf. D3, page 2, left-hand column, lines 20-25, lines 30-34; Fig. 1; cup-shaped antenna element 1).

It is to be noted, that the subject-matter of independent method type Claims 5 and 7, referring back to apparatus Claims 1-4, is not clear. It appears, that these claims relate to a production method for forming an antenna structure according to the embodiment shown in Fig. 4 and described on page 6, lines 9-22 of the description. A metallization step applied to the "exterior surface of the "cup"-shaped element" as set out in these claims, would cover the outer peripheral area of the block 10 (see Fig. 4), thus rendering the antenna structure inoperable.

- 1.3 Finally, dependent Claims 2, 3, 4 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step:

- * Claim 2: The profiles of the continuously curved antenna element and the earth plane forming support of D1 assure impedance matching of the antenna over a wide frequency range. A profile of the antenna element following the formulas set out in Claim 2 would be one out of several design possibilities for the skilled person to achieve wide band impedance matching, without the exercise of inventive skill (cf. D1, page 3, left-hand column, lines 28-29; D4; Fig. 1, 10, 12).
- * Claims 3, 4: An earth plane forming support of annular shape comprising a circular annulus forming a semi-toroidal element is known from D1 (D1, Fig. 10, 52, 53; page 3, right-hand column, lines 9-10);

CLAIMS

1 – Broadband monopole antenna, comprising a radiating element (11) mounted on an earth plane forming support (12) of annular shape, characterized in that the radiating element is constituted by a hollow element having a "cup" shape integral with the earth plane forming support, said radiating element and said support being made on the basis of a metallizable plastic or foam.

2 – Antenna according to Claim 1, characterized in that the external profile of the "cup"-shaped radiating element is given by the following equations:

For $1.3 < t < 4.075$

$$x(t) = 8 + 1.9 * t * \cos(t - 7)$$

$$z(t) = 2.5 + 12.5 \frac{\sin(t)}{t}$$

3 – Antenna according to any one of Claims 1 and 2, characterized in that the earth plane forming support (3) of annular shape consists of a circular annulus (3a).

4 – Antenna according to Claim 3, characterized in that the external end of the annulus is inwardly curved in such a way as to form a semi-toroidal element.

5 – Process for manufacturing an antenna according to any one of Claims 1 to 4, characterized in that the "cup"-shaped radiating element and the earth plane forming support are made by injection moulding of a plastic followed by the metallization of at least the exterior surface of the "cup"-shaped element and of the part forming earth plane.

6 – Process according to Claim 5, characterized in that the metallization is achieved by vacuum spraying of the metal or by an electrochemical process.

5 7 – Process for manufacturing an antenna according to any one of Claims 1 to 4, characterized in that the "cup"-shaped radiating element and the earth plane forming support are made by machining a single block of plastic foam followed by the metallization of at least the exterior surface of the "cup"-shaped element and of the part forming earth plane.

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8 – Process according to Claim 7, characterized in that the metallization is achieved by atomization of an electrically conducting paint.